NEX-PCMCIA

PCMCIA Bus Adapter Users Manual

Including these Software Support packages:

PCMCIA

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1.0 OVERVIEW

1.1 General Information

The NEX-PCMCIA adapter has been designed to provide quick and easy connections to interface a 68, 102, or 136 channel TLA600/700, a 92A96 or 92C96 acquisition module to a PCMCIA card slot. (The PCMCIA designation refers to the Personal Computer Memory Card Internal Association specification.) In addition, the method of connection permits the use of other acquisition cards (such as the 92HS8 2GHz high-speed module), pattern generation cards (such as the 92S32 50MHz Pattern Generator) or other measurement devices such as oscilloscopes.

This manual assumes that the user is aware that the 92A96 and 92C96 modules from Tektronix are essentially identical. This manual therefore refers to the 92A96 but the 92C96 could be substituted in all cases. References to the TLA700 also apply to TLA600 and a TLA700 with a TLA704 or TLA711 chassis with one or more 7L2/3/4 or 7M2/3/4 acquisition cards.

Appendix D is a silk-screen print of the NEX-PCMCIA Adapter board. Referring to this drawing while reading the manual is suggested.

This manual assumes that the user is familiar with the PCMCIA Bus specification and the Tektronix DAS 9200 or TLA600/700 Logic Analyzer. Also in the case of the TLA600/700, it is expected that the user is familiar with Windows 95.

2.0 SOFTWARE INSTALLATION

Two 3½" diskettes have been included with the NEX-PCMCIA Bus Adapter. One is for use with the TLA600/700 series, the other is to be used with a DAS9200 or TLA500.

2.1 TLA600/700

The PCMCIA support software is loaded in the same method as other Win95 programs. Place the NEX-PCMCIA Install disk in the floppy drive of the TLA600/700. Select **Control Panel** and run **Add/Remove Programs**, choose **Install**, **Next**, then **Finish**. Add/Remove will then run SETUP.EXE on the floppy and install the support in its proper place on the hard disk.

To load a support into the TLA600/700, first select the desired Logic Analyzer card in the Setup screen, select Load Support Package from the File pull-down, then choose PCMCIA and click on **Okay**. Note that the Logic Analyzer card must be at least 68-channels in width.

2.2 DAS 9200

The included diskette should be loaded onto the DAS 9200 using the Install Application function. This function is available from the Disk Services menu of the DAS. For more information, refer to the Tektronix DAS 9200 System User's Manual.

Load the desired support from within the 92A96 Config menu. Select "PCMCIA Support", press <RETURN>, and the channel grouping, clocking and symbols will then be loaded.

3.0 CONFIGURING the NEX-PCMCIA BUS ADAPTER

The NEX-PCMCIA adapter is longer than a standard PCMCIA module, and is designed to function both as signal break-out board and as an extender card. An external connector is available to supply power to the DUT (Device Under Test) that is separate from the power supplied by the target system. To use this feature simply wire the external power supply to the VPP1, VPP2, VCC, and GND connections on the terminal block. To power the DUT from external power move the jumpers at JP1, JP2, and JP3 from their default SYS setting (the lower two pins) to the EXT setting (the upper pair of pins).

4.0 CONNECTING to the NEX-PCMCIA ADAPTER

4.1 General

When using either the 92A96 or TLA600/700, sections D2 and D3 are available for acquiring any other signals of interest. By default the groups containing these sections (Aux_A and Aux_B respectively) are not displayed, but they may be enabled at any time. These signals need not be on the NEX-PCMCIA card but may be signals located on the DUT or on the controlling system. Signals on these sections (D2 and D3) will be acquired and stored at the end of the PCMCIA bus cycle.

4.2 92A96

When using a 92A96, connect the grouped pods (8 podlets to a group) to their appropriate locations by following the silk-screen information printed on the adapter board. The 92A96 pods used are A0-A3, D0, D1, C0 and C2. Each pod has its proper location denoted on the silk-screen of the adapter board. When attaching the pods, follow the silk-screen information on the board showing the ground and signal pin locations. The colored sides of the podlets, the signal side, should face either the center of the adapter board or the board end that plugs into the host system.

Connect the three clock leads (CLK0, CLK1, and CLK2) to their specified locations at J13 (the only connector with 4 locations). Again, follow the silk-screened information to properly

connect the clock input and its ground. Table 1 shows the wiring and Channel Grouping for the 92A96 when used with PCMCIA Support.

4.3 TLA600/700

The TLA600/700 will be connected in the same method as an A96. However, it's important to note that signal group C3 is used in place of A96 group C0. Table 1 shows the Channel Grouping and wiring for the TLA600/700 when used with PCMCIA Support.

4.4 Inserting / Removing PCMCIA DUT Cards

It is recommended that the NEX-PCMCIA adapter board be connected to the target system prior to inserting a PCMCIA DUT. Because the NEX-PCMCIA card does not have the mechanical guides typically found in PCMCIA designs, it is recommended that care be taken to insert and remove the DUT as smoothly as possible. When used in this fashion and when the DUT is powered from the target system (power jumpers in the SYS position) the power LEDs will not be on until a DUT is installed in the NEX-PCMCIA adapter.

Group Name	Signal Name	PCMCIA Pin #	92A96 input	TLA700 input
Address (HEX)	A25	56	A3:1	A3:1
	A24	55	A3:0	A3:0
	A23	54	A2:7	A2:7
	A22	53	A2:6	A2:6
	A21	50	A2:5	A2:5
	A20	49	A2:4	A2:4
	A19	48	A2:3	A2:3
	A18	47	A2:2	A2:2
	A17	46	A2:1	A2:1
	A16	19	A2:0	A2:0
	A15	20	A1:7	A1:7
	A14	14	A1:6	A1:6
	A13	13	A1:5	A1:5
	A12	21	A1:4	A1:4
	A11	10	A1:3	A1:3
	A10	8	A1:2	A1:2
	A9	11	A1:1	A1:1
	A8	12	A1:0	A1:0
	A7	22	A0:7	A0:7
	A6	23	A0:6	A0:6
	A5	24	A0:5	A0:5
	A4	25	A0:4	A0:4
	A3	26	A0:3	A0:3
	A2	27	A0:2	A0:2
	A1	28	A0:1	A0:1
	A0	29	A0:0	A0:0
Control (SYM)	WP/IO16~	33	C2:0	C2:0
	WE~/PGM~	15	C2:5	C2:5
	OE~	9	C2:4	C2:4
	IORD~	44	C2:6	C2:6
	IOWR~	45	C2:7	C2:7
	RESET	58	C2:2	C2:2
	WAIT~	59	C2:3	C2:3

Group Name	Signal Name	PCMCIA Pin #	92A96 input	TLA700 input
Data (HEX)	D15	41	D1:7	D1:7
	D14	40	D1:6	D1:6
	D13	39	D1:5	D1:5
	D12	38	D1:4	D1:4
	D11	37	D1:3	D1:3
	D10	66	D1:2	D1:2
	D9	65	D1:1	D1:1
	D8	64	D1:0	D1:0
	D7	6	D0:7	D0:7
	D6	5	D0:6	D0:6
	D5	4	D0:5	D0:5
	D4	3	D0:4	D0:4
	D3	2	D0:3	D0:3
	D2	33	D0:2	D0:2
	D1	31	D0:1	D0:1
	D0	30	D0:0	D0:0
Misc (OFF)	D_CLK	*	C0:4	---
	RFU57	57	C0:3	C3:3
	SPKR	62	C0:1	C3:1
	STSCHG	63	C0:0	C3:0
	RFSH	43	C0:2	C3:2
	REG~	61	A3:3	A3:3
	CD2~	67	A3:7	A3:7
	CD1~	36	A3:6	A3:6
	CE2~	42	A3:5	A3:5
	CE1~	7	A3:4	A3:4
	INPACK~	60	A3:2	A3:2

Clock:0	D_CLK	*		
Clock:1	IORD~	44		
Clock:2	RFSH	43		
Clock:3				

Table 1- PCMCIA 92A96 / TLA600/700 Wiring

* Derived signal

~ Denotes a low true signal

Pattern	Symbol	Meaning
xxxxx1x	RESET	Reset
0xx010x	I/O RD16	16-bit I/O Read
0xx100x	I/O WR16	16-bit I/O Write
1xx010x	I/O RD8	8-bit I/O Read
1xx100x	I/O WR8	8-bit I/O Write
110110x	MEM RD	Memory Read
101110x	MEM WRT	Memory Write
xxxxxx0	WAIT	Wait Cycle

Table 2- PCMCIA Control Symbol Table

Signals, from left to right:WP/IO16~, WE~/PGM~, OE~, IORD~, IOWR~, RESET, WAIT~

5.0 CLOCK SELECTION and VIEWING DATA

5.1 General Information

All PCMCIA data is usually acquired on the rising edge of IORD~, IOWR~, OE~, or WE~/PGM~. The only difference is when IORD~ is active - certain control lines are stored on the falling edge of IORD~ to ensure proper acquisition. For proper PCMCIA cycle acquisition these signals must be present.

5.2 Viewing State Data with the DAS 9200

After an acquisition is made the DAS 9200 Logic Analyzer will display the data in State Display mode (as a default only). Address and Data information is displayed in hexadecimal format; Control data is displayed using symbols; Miscellaneous and both Auxiliary data groups default to OFF.

The use of Symbol Tables when displaying state data enables the user to quickly determine what type of bus cycle was acquired. One symbol table (Table 4) has been provided to show the type of transaction that occurred on the PCMCIA bus, and its DAS filename is "PCMCIA_Ctrl". This symbol table quickly shows whether the acquisition was a memory or I/O operation, whether it was a read or a write, etc.

It is important to note that changing the group, channel, or wiring of the Control group can result in incorrect symbol information being displayed.

5.3 Viewing State Data with the TLA600/700

After making an initial acquisition, the TLA600/700 will display the data in the Listing (State) format. Address and Data information is displayed in hexadecimal format; Transfer, Mode, and Misc data is displayed using symbols; Interrupts (Intrpts) and Bus Master (BusMstr) data groups default to Hexadecimal.

The use of Symbol Tables when displaying state data enables the user to quickly determine what type of bus cycle was acquired. When using NEX-PCMCIA, a symbol table (PCMCIA_CTRL) has been provided to show the type of transfer that occurred on the PCMCIA bus. PCMCIA_CTRL has the same definition as the symbol table used in the DAS (see Table 4).

Again, it must be noted that changing the group, channel, or wiring of the Control group can result in incorrect symbol information being displayed.

5.4 Viewing Timing Data with the DAS 9200

It may be useful to display acquired information using the Timing Diagram display of the DAS 9200. (Note that, unlike some other logic analyzers, with the DAS 9200 there is no need to re-acquire PCMCIA data when changing from one display mode to another. The same data can be viewed in either format.) This method of data display can be particularly useful when an asynchronous acquisition has been made (using the DAS 9200 internal acquisition clock) to determine the relationships between signal edges.

The 92A96 is particularly well suited for this mode of operation because of its ability to acquire data asynchronously at a 400MHz rate, providing 2.5ns of timing resolution.

Refer to the appropriate Tektronix DAS 92A96 Module User's Manual for more detailed information on formatting the display of the acquired data.

5.5 Viewing Timing Data with the TLA600/700

By default, the TLA600/700 will display an acquisition in the Listing (State) mode. However, the same data can be displayed in Timing form by adding a Waveform Display window. This is done by clicking on the **Window** pull-down, selecting **New Data Window**, clicking on **Waveform Window Type**, then choosing the Data Source. Two choices are presented: PCMCIA and PCMCIA-MagniVu. The first (PCMCIA) will show the exact same data (same acquisition mode) as that shown in the Listing window, except in Timing format. The second selection, PCMCIA-MagniVu, will show all of the channels in 2GHz MagniVu mode, so that edge relationships can be examined at the module’s trigger point. With either selection, all

channels can be viewed by scrolling down the window. Refer to the TLA600/700 System User's Manual for additional information on formatting the Waveform display.

Like all Tektronix logic analyzers, the acquired data can be viewed in Timing format as well as State format, without having to make another acquisition. Simply select "Timing" in the display section of the Prism.

APPENDIX A - Necessary Signals for Clocking

To properly acquire PCMCIA bus activity, the following signals must be provided: IORD~, IOWR~, OE~, and WE~/PGM~. With the exception of IORD~ the rising edge of these signals is used as the active clocking edge. When IORD~ is active both edges are used to acquire data.

APPENDIX B - Considerations

B.1 PCMCIA Loading

It must be noted that the NEX-PCMCIA Bus Adapter does not provide any buffering of the PCMCIA bus signals. This was a conscious design decision that was made by balancing the tradeoffs of loading versus design simplicity and signal acquisition accuracy. By not introducing signal buffers it is possible, using the NEX-PCMCIA adapter, to see the exact timing relationships and signal waveforms from the system. It is also much easier to connect pattern generators to the bus since buffer direction is not a concern. It is believed that the signal loading of the 92A96 or TLA600/700 acquisition cards is low enough so that PCMCIA signal degradation will not occur.

B.2 Pattern Generation

Because there is no buffer circuitry on the NEX-PCMCIA Adapter, it is well suited for use with the 92S16 and 92S32 Pattern Generator modules available for the DAS 9200. By connecting pattern generator probes to the A96 signal connectors on the Adapter, desired bus activity can be simulated. This can be particularly effective when trying to debug interrupt or DMA conflicts.

It should be noted that, because of the pin spacing of the A96 connectors, it is not recommended that the Tektronix P6464 or P6465 pattern generator probes be used without providing adequate cooling for their podlets. These probes use active podlets that can get very warm in use. A better choice would be the P6463 pods which are passive and do not have such cooling requirements.

B.3 3.3V Support

For support of 3.3V PCMCIA cards please contact Nexus Technology, Inc. for upgrade information.

B.4 Inserting / Removing PCMCIA DUT Cards

It is recommended that the NEX-PCMCIA adapter board be connected to the target system prior to inserting a PCMCIA DUT. Because the NEX-PCMCIA card does not have the mechanical guides typically found in PCMCIA designs, it is recommended that care be taken to insert and remove the DUT as smoothly as possible. When used in this fashion and when the DUT is powered from the target system (power jumpers in the SYS position) the power LEDs will not be on until a DUT is installed in the NEX-PCMCIA adapter.

APPENDIX C - PCMCIA Pinout

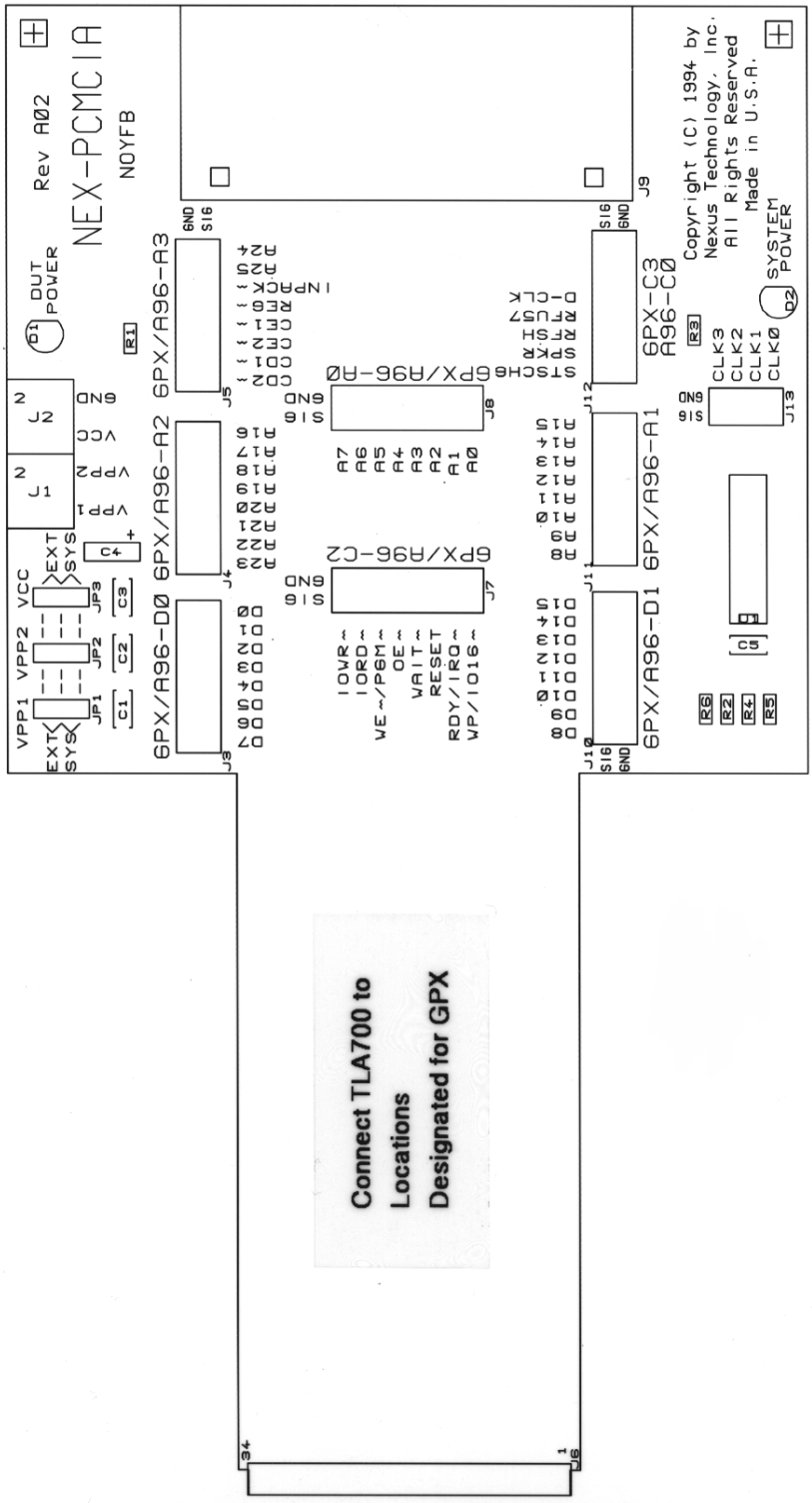
Pin	Signal	Function	Pin	Signal	Function
1	GND	Ground	35	GND	Ground
2	D3	Data bit 3	36	CD1~	Card detect 1
3	D4	Data bit 4	37	D11	Data bit 11
4	D5	Data bit 5	38	D12	Data bit 12
5	D6	Data bit 6	39	D13	Data bit 13
6	D7	Data bit 7	40	D14	Data bit 14
7	CE1~	Card enable 1	41	D15	Data bit 15
8	A10	Address bit 10	42	CE2~	Card enable 2
9	OE~	Output enable	43	RFSH	Refresh
10	A11	Address bit 11	44	RFU	Reserved
11	A9	Address bit 9	45	RFU	Reserved
12	A8	Address bit 8	46	A17	Address bit 17
13	A13	Address bit 13	47	A18	Address bit 18
14	A14	Address bit 14	48	A19	Address bit 19
15	WE~/PGM~	Write enable	49	A20	Address bit 20
16	RDY/BSY	Ready/Busy	50	A21	Address bit 21
17	Vcc		51	Vcc	
18	Vpp1	Programming Supply Voltage 1	52	Vpp2	Programming Supply Voltage 2
19	A16	Address bit 16	53	A22	Address bit 22
20	A15	Address bit 15	54	A23	Address bit 23
21	A12	Address bit 12	55	A24	Address bit 24
22	A7	Address bit 7	56	A25	Address bit 25
23	A6	Address bit 6	57	RFU	Reserved
24	A5	Address bit 5	58	RESET	Card Reset
25	A4	Address bit 4	59	WAIT~	Extend bus cycle
26	A3	Address bit 3	60	RFU	Reserved
27	A2	Address bit 2	61	REG~	Register select
28	A1	Address bit 1	62	BVD2	Battery voltage detect 2
29	A0	Address bit 0	63	BVD1	Battery voltage detect 1
30	D0	Data bit 0	64	D8	Data bit 8
31	D1	Data bit 1	65	D9	Data bit 9
32	D2	Data bit 2	66	D10	Data bit 10
33	WP	Write protect	67	CD2~	Card detect 2
34	GND	Ground	68	GND	Ground

Table 3- PCMCIA Memory Only Card Interface

Pin	Signal	Function	Pin	Signal	Function
1	GND	Ground	35	GND	Ground
2	D3	Data bit 3	36	CD1~	Card detect 1
3	D4	Data bit 4	37	D11	Data bit 11
4	D5	Data bit 5	38	D12	Data bit 12
5	D6	Data bit 6	39	D13	Data bit 13
6	D7	Data bit 7	40	D14	Data bit 14
7	CE1~	Card enable 1	41	D15	Data bit 15
8	A10	Address bit 10	42	CE2~	Card enable 2
9	OE~	Output enable	43	RFSH	Refresh
10	A11	Address bit 11	44	IORD~	IO Read
11	A9	Address bit 9	45	IOWR~	IO Write
12	A8	Address bit 8	46	A17	Address bit 17
13	A13	Address bit 13	47	A18	Address bit 18
14	A14	Address bit 14	48	A19	Address bit 19
15	WE~/PGM~	Write enable	49	A20	Address bit 20
16	IREQ~	Interrupt Request	50	A21	Address bit 21
17	Vcc		51	Vcc	
18	Vpp1	Programming Supply Voltage 1	52	Vpp2	Programming Supply Voltage 2
19	A16	Address bit 16	53	A22	Address bit 22
20	A15	Address bit 15	54	A23	Address bit 23
21	A12	Address bit 12	55	A24	Address bit 24
22	A7	Address bit 7	56	A25	Address bit 25
23	A6	Address bit 6	57	RFU	Reserved
24	A5	Address bit 5	58	RESET	Card Reset
25	A4	Address bit 4	59	WAIT~	Extend bus cycle
26	A3	Address bit 3	60	INPACK~	Input Port Acknowledge
27	A2	Address bit 2	61	REG~	Register select & IO Enable
28	A1	Address bit 1	62	SPKR~	Audio Digital Waveform
29	A0	Address bit 0	63	STSCHG~	Card Status Changed
30	D0	Data bit 0	64	D8	Data bit 8
31	D1	Data bit 1	65	D9	Data bit 9
32	D2	Data bit 2	66	D10	Data bit 10
33	IOIS16~	IO Port is 16-bit	67	CD2~	Card detect 2
34	GND	Ground	68	GND	Ground

Table 4- PCMCIA I/O and Memory Card Interface

APPENDIX D - NEX-PCMCIA Silk Screen



APPENDIX E - Support

About Nexus Technology, Inc.

Established in 1991, Nexus Technology, Inc. is dedicated to developing, marketing, and supporting Bus Analysis applications for Tektronix Logic Analyzers.

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Support Contact Information

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General Information	**support@nexustechnology.com**
Quote Requests	**quotes@nexustechnology.com**

We will try to respond within one business day.

If Problems Are Found

Document the problem and e-mail the information to us. If at all possible please forward a Saved System Setup (with acquired data) that shows the problem. Do not send a text listing alone as that does not contain enough data for analysis. To prevent corruption during the mailing process it is strongly suggested that the Setup be zipped before transmission.

APPENDIX F - References

Tektronix DAS 9200 System User's Manual

Tektronix DAS 9200 92A96 User's Manual

Tektronix TLA600/700 System User's Manual

Tektronix TLA600/700 Logic Analyzer User's Manual

PCMCIA PC Card Standard, Release 2.1, July 1993

“PCMCIA Developer’s Guide, The” by Michael T. Mori
Published by Sycard Technology